# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/W.No.08/MCPK/CEMENT/2014-15 Date: 15.10.2014

## TEST REPORT

| | | |
|---|---|---|
| CLIENT | : | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | : | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| NAME OF THE WORK | : | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| REFERENCE | : | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| SAMPLE ID | : | CEMENT |
| SAMPLES SUPPLIED BY | : | AGENCY |

The results of the tests conducted on the cement sample are as follows:

| Sl.No | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 1989-2013 |
|---|---|---|---|---|
| 1 | Standard Consistency | IS-4031 (Part -4) | 29.00 % | - |
| 2 | a) Initial Setting Time | IS-4031 (Part -5) | 140 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part -5) | 480 Minutes | Not More than 600 Minutes |
| 3 | Soundness by the Le-Chatelier method | IS-4031 (Part 3) | 1 mm | Not more than 10 mm |

Note:

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JAS-ANZ BSCIC ISO 9001 REGISTERED


Job No.: CTCE/BBMP/W.No.08/MCPK/SAND/2014-15 : 15.10.2014

## TEST REPORT ON FINE AGGREGATES
## IS 383-1970 (RA- 2002)

**Client** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

**Agency** : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore.

**Name of Work** : Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore.

**Reference** : AEE/KH/WO/32/2014-15 Dated: 20.10.2014

Date of Testing : 15.10.2014

Material : Sand Total Wt. of Aggregates in gms **2000**

| Is Sieve Size in mm | Weight Retained (gm) | Retained Weight in % | Cumulative Retained Weight in % | Cumulative Weight Passing in % | Spec.Limits For Zone-II |
|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 100 | 100 |
| 4.75 | 60 | 3.00 | 3.00 | 97.0 | 90-100 |
| 2.36 | 250 | 12.50 | 15.50 | 84.5 | 75-100 |
| 1.18 | 392 | 19.60 | 35.10 | 64.9 | 55-90 |
| 600 Micron | 480 | 24.00 | 59.10 | 40.9 | 35-59 |
| 300 Micron | 425 | 21.25 | 80.35 | 19.7 | 8-30 |
| 150 Micron | 290 | 14.50 | 94.85 | 5.2 | 0-10 |

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Job No.: CTCE/BBMP/W.No.08/MCPK/AGG/2014-15 : 15.10.2014

## TEST REPORT ON COARSE AGGREGATES
## IS 383-1970 (RA- 2002)

**Client** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

**Agency** : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore.

**Name of Work** : Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore.

**Reference** : AEE/KH/WO/32/2014-15 Dated: 20.10.2014

Date of Testing : 15.10.2014

Material : 40mm Aggregates

Total Wt. of Aggregates in gms **25000**

| Is Sieve Size in mm | Weight Retained (gm) | Retained Weight in % | Cumulative Retained Weight in % | Cumulative Weight Passing in % | Spec.Limits |
|---|---|---|---|---|---|
| 80 | 0 | 0 | 0 | 100 | 100 |
| 40 | 935 | 3.74 | 3.74 | 96.26 | 95-100 |
| 20 | 16050 | 64.20 | 67.94 | 32.06 | 30-70 |
| 10 | 4150 | 16.60 | 84.54 | 15.46 | 10-35 |
| 4.75 | 3300 | 13.20 | 97.74 | 2.26 | 0-5 |

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Job No.: CTCE/BBMP/W.No.08/MCPK/STEEL/2014-15 15.10.2014

## TEST REPORT ON REINFORCEMENT STEEL

| | | |
|---|---|---|
| Client | : | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | : | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of the Work | : | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | : | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Date of Test | : | 15.10.2014 |
| Technical Reference | : | IS: 1786-2008 |

| Sl. No | Nominal size (dia) (mm) | Mass per metre (Kg/mtr) | TENSILE STRENGTH | | | Bend Test | Rebend Test |
|---|---|---|---|---|---|---|---|
| | | | 0.20% proof stress/Yield stress $N/mm^2$ | Tensile strength (Ultimate stress) $N/mm^2$ | Elongation percent gauge length | | |
| 1 | 10 | 0.62 | 514 | 557 | 13.10 | O.K | O.K |

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Job No.: CTCE/BBMP/W.No.08/MCPK/WMM/AIV/2014-15

05.11.2014

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Client** | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| **Name of the Work** | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| **Reference** | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| **Source / Location** | WMM Plant |
| **Type of Mix** | Wet Mix macadam |
| **Date of Testing** | 05.11.2014 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 382 | 383 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 82 | 83 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 300 | 300 | |
| 4 | Aggregate Impact value = percent fines | 21.47 | 21.67 | |
| | 100* ($W_2/W_1$)% | | | 21.62 |

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/MCPK/WMM/S-T/2014-15 — 05.11.2014

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of Work | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Date of Testing | 05.11.2014 |

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Result : Flakiness Index = **11.68%**

Elongation Index = **13.26%**

**Result : Combined Flakiness & Elongation index** **24.94%**

**Comments:**

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

**Note:**

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Job No.: CTCE/BBMP/W.No.08/MCPK/SDBC/AIV/2014-15 20.11.2014

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of the Work | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Source / Location | Hot Mix Plant, Bangalore |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 20.11.2014 |

| Sl No. | Details | Trial No. 1 | Trial No. 3 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 385 | 386 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 84 | 82 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 301 | 304 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$)% | 21.82 | 21.24 | 21.53 |

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.08/MCPK/SDBC/Shape_T/2014-15 - : 20.11.2014

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Client | : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of Work | : Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | : AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2007) |
| Type of Mix | : Semi Dense Bituminous Concrete |
| Date of Testing | : 20.11.2014 |

Result : Flakiness Index = **11.05%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **24.90%**

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Job No.: CTCE/BBMP/W.No.08/MCPK/SDBC/Stripping/2014-15 20.11.2014

## Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

| | |
|---|---|
| **Client** | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| **Name of the work** | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| **Reference** | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| **Type of Mix** | Semi Dense Bituminous Concrete |
| **Date of Testing** | 20.11.2014 |

Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

| Observation Number | Stripping, Percentage | Average, Percentage | Average Retained Coating, % |
|---|---|---|---|
| 1 | 3.1 | 3.20 | 96.80 |
| 2 | 3.2 | | |
| 3 | 3.3 | | |

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/MCPK/SDBC/Sp_Wa/2014-15 20.11.2014

## Specific Gravity And Water Absorption Test

IS: 2386 Part III

| | |
|---|---|
| **Client** | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| **Name of the Work** | Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| **Reference** | AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| **Type of Mix** | Semi Dense Bituminous Concrete |
| **Source / Location** | Hotmix Plant, Bangalore |
| **Date of Testing** | 20.11.2014 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 2021 | 2022 | 2024 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 750 | 750 | 750 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1271 | 1272 | 1274 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2040 | 2042 | 2043 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 769 | 770 | 769 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 2026 | 2023 | 2025 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.635 | 2.627 | 2.633 | 2.632 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.683 | 2.694 | 2.696 | 2.691 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.69% | 0.94% | 0.89% | 0.84% |

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.08/MCPK/CUBE/2014-15

18.11.2014

## TEST REPORT ON CONCRETE CUBES

| | |
|---|---|
| Client | : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of the work | : Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | : AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Sample ID | : Drain Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{20}$ |
| Compressive Strength as on | : $28^{th}$ day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 21.10.2014 | 18.11.2014 | 8.125 | 475.5 | 21.13 |
| 2 | 21.10.2014 | 18.11.2014 | 8.265 | 492.3 | 21.88 |
| 3 | 21.10.2014 | 18.11.2014 | 8.396 | 502.3 | 22.32 |

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Job No.: CTCE/BBMP/W.No.08/MCPK/CUBE/2014-15

18.11.2014

## TEST REPORT ON CONCRETE CUBES

| | |
|---|---|
| Client | : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
| Name of the work | : Improvements to Roads & Drains at CQAL Layout in Ward No.08, BBMP, Bangalore. |
| Reference | : AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Sample ID | : Drain Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{20}$ |
| Compressive Strength as on | : $28^{th}$ day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 21.10.2014 | 18.11.2014 | 8.135 | 485.6 | 21.58 |
| 2 | 21.10.2014 | 18.11.2014 | 8.297 | 498.6 | 22.16 |
| 3 | 21.10.2014 | 18.11.2014 | 8.390 | 516.3 | 22.95 |

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## TEST REPORT ON CONCRETE CUBES

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|---|---|
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| Agency | : **Mr. M.C. Pavan Kumar,** Contractor, Bangalore. |
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| Reference | : AEE/KH/WO/32/2014-15 Dated: 20.10.2014 |
| Sample ID | : Drain Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{15}$ |
| Compressive Strength as on | : $28^{th}$ day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 19.10.2014 | 16.11.2014 | 8.110 | 353.6 | 15.72 |
| 2 | 19.10.2014 | 16.11.2014 | 8.285 | 365.4 | 16.24 |
| 3 | 19.10.2014 | 16.11.2014 | 8.339 | 379.6 | 16.87 |

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